

**Remarks**

**35 U.S.C. § 103**

In the Office Action, the Examiner rejects claims 1, 5-7, 9-17, and 21-31 under 35 U.S.C. § 103(a) as being unpatentable over United States Patent No. 5,852,211 issued to Dumpelman et al. (hereinafter "Dumpelman") in view of EP Patent No. 0 174 624 issued to Bott et al. (hereinafter "Bott") (together "Cited References"). Applicants respectfully traverse the rejection.

Applicant have amended the claims to clarify that the process for the recovery of an organic acid from a fermentation broth comprising the steps of conducting a fermentation to produce a fermentation broth, wherein the fermentation broth comprises an organic acid and microbial biomass and drying the fermentation broth to obtain an organic acid-containing dried product, wherein the drying occurs without prior removal of the microbial biomass from the organic acid-containing fermentation broth.

Applicants respectfully request reconsideration of the rejections based upon the Cited References. Certain basic considerations apply to obviousness rejections. The Manual of Patent Examining Procedures ("MPEP") describes the following tenets of patent law which must be adhered to:

- (A) The claimed invention must be considered as a whole;
- (B) The references must be considered as a whole and must suggest the desirability and thus the obviousness of making the combination;
- (C) The references must be viewed without the benefit of impermissible hindsight vision afforded by the claimed invention and

(D) Reasonable expectation of success is the standard with which obviousness is determined. *MPEP §2141*, citing *Hodosh v. Block Drug, Inc.*, 786 F.2d 1136, 1143 n.5, 229 U.S.P.Q 182, 187 n.5 (Fed. Cir. 1986).

Applicants respectfully submit that the Examiner has not presented a *prima facie* case of obviousness. For at least the reasons, that all the limitations of the claims, as amended, are not in the cited references, there is no motivation or suggestion in the prior art, and there was no reasonable expectation of success for the change in the processes of the Cited References.

All of the limitations of the claims must be present in the combination of references to reject the claims under 35 U.S.C. §103. Neither of the Cited References, however, disclose a process wherein the drying occurs without prior removal of the microbial biomass from the organic acid-containing fermentation broth. Therefore, an obviousness rejection is not complete. In addition, Dumpelman et al. teaches away from the filtering prior to crystallization by stating that the object of the invention is to permit in the simplest possible manner the conversion of the sodium salt of 2-keto-L-gulonic acid, which is present in an aqueous, non-purified fermentation broth, into free 2-keto-L-gulonic acid in alcoholic solution in high yield and with high purity.

A reasonable expectation of success is required to have a *prima facie* case of obviousness. Applicants contend that one skilled in the art would have no reasonable expectation of success of producing an organic acid by drying the fermentation broth without prior filtration of biomass. This is truly a surprising result. As evidence of this, Dumpelman with filtering of the fermentation broth prior to spray drying calls his process "simplest possible manner" of producing the organic acid. However, the method of the subject application is clearly more simple. The solid

biomass and the crystallized byproduct acid are both removed in the same filtration step. Therefore, an obviousness rejection is not appropriate.

Example 1, as well as elsewhere in the specification as filed, provides a written description of the process as claimed. Example 1 of the subject application was performed wherein the drying occurs without prior removal of the microbial biomass from the organic acid-containing fermentation broth. The attached Declaration of Kevin Moore dated April 8, 2004 further describes the process performed in Example 1. As stated in the Declaration, the fermentation of Example 1 was performed to produce a fermentation broth comprising both the organic acid and the biomass. The fermentation broth was subsequently spray dried without filtering to remove biomass, therefore the dried product contained substantially all the biomass produced in the fermentation.

United States Patent No. 5,834,231 (the "231 patent") is referenced in Example 1. The '231 patent describes a process for the production of 2-keto-1-gulonic acid by the fermentation conversion of L-sorbose and/or sorbitol. The patent is referred to in Example 1 for the method of conducting the fermentation and not for the method of treating the whole fermentation broth. The attached Declaration by Kevin Moore clarifies the process used of Example 1. As stated, Example 1 of the Subject Application demonstrates the method of the claimed invention comprising conducting a fermentation to produce a fermentation broth, wherein the fermentation broth comprises an organic acid and microbial biomass, drying the fermentation broth to obtain an organic acid-containing dried product, wherein said drying occurs without prior removal of said microbial biomass from the organic acid-containing fermentation broth. The dried product may then be added to a lower alcohol in the presence of an acid, wherein said acid can be any acid which allows for selective recovery of the

desired organic acid. A subsequent step is removing insolubles to obtain an organic acid, wherein the insolubles include the microbial biomass.

Specifically, Example 1 describes a process for the production of 2-keto-L-gulonic acid. The fermentation of Example 1 was prepared as described the '231 patent to produce a fermentation broth comprising an organic acid and microbial biomass. The fermentation was conducted in two steps as described in the '231 patent. As described in col. 5, lines 39-56, Strain ATCC 621 was used to convert sorbitol to sorbose. The fermentation included, as described in col. 6, additional components added to the medium including supplemental carbon sources (mannitol), nitrogen sources (Hysoy T and 10% corn steep liquor) and trace nutrients (Niacinamide, Thiamine, Pantothenic Acid, and Para amino benzoic acid). After conversion of sorbitol to sorbose the medium is pasteurization in an autoclave. The sorbose was then converted to 2-keto-L-gulonic acid as indicated in column 6, lines 42-58. In the case of Example 1, the medium was inoculated with strain ADM 115-172, a mutant variant of NRRL B-21627. The conversion of sorbose to 2-keto-L-gulonic acid was aided by a "helper" strain of *B. Lichenformis* (ADM B102) as described in column 7, lines 15-38. Conversion of sorbose to 2-keto-L-gulonic acid is at a pH of 6.5, a temperature of 30°C with 1.5 vol./vol/min of air and a 275 rpm fermenter agitator speed for about 60 hours to prepare the fermentation broth comprising the organic acid and the microbial biomass. The fermentation broth comprised, as indicated in Example 1, 84 g/l 2-keto-L-gulonic acid, 4g/l sorbose and 136 g/l total dry solids including the microbial biomass ("whole fermentation broth").

After the whole fermentation broth was prepared as described above, the whole fermentation broth was dried to obtain an organic acid-containing dried product, wherein the drying occurred without prior removal of the dry solids or the

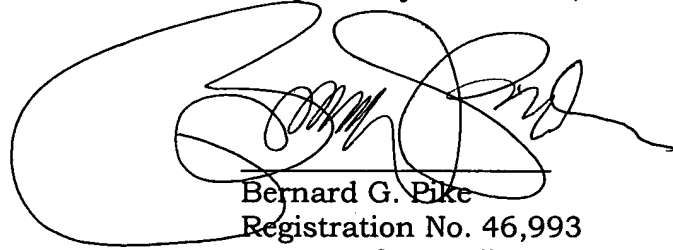
microbial biomass from the whole fermentation broth. The dried product was then further processed, as described in Example 1, by adding the dried product to a lower alcohol, anhydrous methanol, in the presence of an acid, sulfuric acid, finally removing the microbial biomass from the 2-keto-L-gulonic acid. The process as described was subsequently repeated and enables one skilled in the art to conduct the claimed invention.

As such, Applicants respectfully submit that the process as claimed is fully described, enabled, and not anticipated by the Cited References or any other references cited in the subject application. Reconsideration of the rejections is respectfully requested.

**Conclusion**

Applicants have made a diligent effort to fully respond to all the concerns and comments of the Examiner. Therefore, Applicants respectfully request that a timely Notice of Allowance be issued in the subject application. If the Examiner has any concerns regarding Applicants' present response, he is invited to contact Applicants' undersigned representative at the telephone number listed below so that those concerns may be expeditiously addressed.

Respectfully submitted,

A large, stylized handwritten signature in black ink, appearing to read 'Bernard G. Pike', is written over a horizontal line.

Bernard G. Pike  
Registration No. 46,993  
Attorney for Applicant

KIRKPATRICK & LOCKHART LLP  
Henry W. Oliver Building  
535 Smithfield Street  
Pittsburgh, PA 15222-2312

Telephone: (412) 355-8620  
Facsimile: (412) 355-6501

Customer No.: 41,835